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Catalogue

Tabanidae (Diptera) holotypes in the KwaZulu-Natal Museum collection: Part 2. Diachlorini and Tabanini

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Abstract

All primary (name-bearing) and secondary types (paratypes) of *Bartolomeudiasiella*, *Cydistomyia* and *Limata* within the tribe Diachlorini and *Hybomitra*, *Tabanus* and *Therioplectes* within the tribe Tabanini, deposited in the KwaZulu-Natal Museum (NMSA) are documented: *Cydistomyia* (*Amanella*) *cooksoni* Usher, 1965; *Cydistomyia* (*Amanella*) *grayi* (Oldroyd, 1957), **comb. nov.**; *Cydistomyia* (*Amanella*) *ignota* Usher, 1965; *Cydistomyia* (*Amanella*) *ingridina* Usher, 1965; *Cydistomyia* (*Amanella*) *shaka* Usher, 1970; *Cydistomyia* (*Amanella*) *zimbiti* Usher, 1970; *Limata kuhnelti* Usher, 1967 [now *Bartolomeudiasiella kuhnelti* (Usher, 1967)]; *Limata miranda* Usher, 1968; *Limata parafacialis* Oldroyd, 1957; *Tabanus crocodilinus* Austen, 1912; *Tabanus flavicoxa* Usher, 1954; *Tabanus nefas* Usher, 1971; *Tabanus postacutus* Oldroyd, 1947; *Tabanus saxicolus* Usher, 1965 [now *Hybomitra saxicolus* (Usher, 1965)]; *Therioplectes zumpti* (Dias, 1956). The reference to the original publication, including the original name, the type locality and the collector, is provided for each species. In addition, brief remarks and colour photographs are provided. This is the second in a series of publications on the primary types of the Tabanidae of the KwaZulu-Natal Museum.

Key words: Horse fly, insect collection, NMSA, paratype, type specimen

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Introduction

The entomology collection of the KwaZulu-Natal Museum (KZNM) consists of approximately 250 000 specimens. It is one of the largest and most representative collections of Afrotropical flies in the southern hemisphere. The Entomology Department was established when Dr B. R. Stuckenberg was appointed in 1953 and is largely Diptera biased (Barraclough and Whittington 1994). The collection has grown through both extensive collecting in southern Africa and the acquisition of other significant regional collections. Acquisition of the Ditsong Museum of Natural History's (previously Transvaal Museum – TMSA) Diptera collection in 1975, through exchange, was especially significant, as was obtaining the Fritz Zumpt collection by donation in 1983. At the time of the

donation, the Zumpt collection was housed at the South African Institute of Medical Research (SAIMR) (Barraclough and Whittington 1994).

To date, the entomology collection of KZNM contains more than 2000 primary types and more than 11700 secondary Diptera types. The collection is housed in almost 1000 insect drawers and includes an alcohol and slide collection.

The KZNM has one of the largest Tabanidae collections in southern Africa (Snyman et al. 2020) and is completely digitised. While tabanids, as vectors of pathogens, are important for both veterinary and medical reasons, some species are also important pollinators (Johnson and Steiner 1997; Johnson and Morita 2006; Baldacchino et al. 2014, 2017). The KZNM collection contains 40 primary and 118 secondary tabanid types representing 11 genera. The collection played an important part in the development of the Oldroyd monographs throughout the 1950s (Oldroyd 1952, 1954, 1957). Subsequently, Pamela Stuckenberg (nèe Usher) actively worked on the collection in the 1960s and 1970s (Barraclough and Whittington 1994).

The challenges associated with unreliable postal services and the costs associated with posting specimens to researchers and institutions around the world have resulted in many institutions refusing to send type specimens on loan. As mitigation, the digitisation of museum records and generating type catalogues that include good quality photos is imperative. It allows researchers digital access to important specimens when travel and/or research funding is not available to physically view the specimens.

Misidentifications of Tabanidae in recent publications have raised concern about the utility of sequences in molecular libraries (Williams et al. 2022). Tabanidae can be difficult to identify, and due to their economic, medical and veterinary importance, image-rich catalogues of type specimens are an invaluable research tool. Hopefully, type catalogues such as this will assist in identifications and have positive knock-on effects that may increase the accuracy of molecular libraries and reduce identification ambiguity in vector biology.

This is the second in a series of publications aimed at increasing the accessibility of the primary types of the Tabanidae housed in the KZNM. The first publication dealt with the primary types of the Haematopotini (Williams and Snyman 2021). Here, the types of the remaining Tabaninae species housed in the KZNM collection are included. The Diachlorini in the KwaZulu-Natal Museum collection are represented by three genera – *Bartolomeudiasiella* Travassos Santos Dias, 1987, *Cydistomyia* Taylor, 1919 and *Limata* Oldroyd, 1954. The Tabanini type specimens are also represented by three genera – *Hybomitra* Enderlein, 1922, *Tabanus* Linnaeus 1758 and *Therioplectes* Zeller, 1842. The holotypes of these genera are presented in an image-rich catalogue, including information on the paratypes. Information is provided on the species with comments pertaining to the taxonomy and physical condition of the specimens.

Methods and materials

Photographs of all the specimens were taken with a Nikon D3200 digital SLR with an AF-D Micro Nikkor 105 mm 1:2.8G lens. Helicon Focus 8 software was used to stack the images and Photopea online software was used to do colour correction. Photo plates of the images were produced in Corel PaintShop Pro vX8.

The label information for each holotype states the new country or province names in square brackets where appropriate. Additional information about the locality from the original publication that is not on the labels, is provided in braces. The GPS co-ordinates provided for the holotype localities were obtained from a gazetteer. The label data of all specimens are digitised as per Darwin Core and available on the Global Biodiversity Information Facility (GBIF - https://www.gbif.org/).

List of primary and secondary types

Tribe Diachlorini

Genus *Cydistomyia* Taylor, 1919: 47. Type species: *Cydistomyia doddi* Taylor, 1919.
Subgenus *Amanella* Oldroyd, 1954: 75 (as genus). Type species: *Tabanus imbecillus* Karsch, 1887.
Genus *Limata* Oldroyd, 1954: 67. Type species: *Tabanus tenicornis* Macquart, 1838.

***Cydistomyia* (*Amanella*) *cooksoni* Usher, 1965: 80 fig. 15.**

Holotype. S. Rhodesia [Zimbabwe] • ♀; N. Vumba, {Umtali District}, D. Cookson, 27.10.63; NMSA-Dip 032228; 18°19'0"S, 29°50'0"E; type number 1901. Fig. 1.

Paratypes. • 1 ♂ and 1 ♀, 27.10.63 and 10.11.63 respectively, from the same locality.

Current status. *Cydistomyia* (*Amanella*) *cooksoni*, Usher, 1965; original combination.

Remarks. There is a spelling error on the holotype label – the species name is spelt "cooskoni'. The publication of the original description lists two paratypes – a male with the collection date 27.10.63 and a female with a collection date of 10.11.63, both from N. Vumba. There are, however, three paratypes in the collection from N. Vumba — one female with a collection date of 27.X.63, and two males, one with the collection date 10.11.63 and a second with the collection date 11.10.64. The condition of the holotype specimen is fair. The head of the specimen is glued to a card that is pinned below the specimen. Both the flagella are broken off.

***Cydistomyia* (*Canalicula*) *grayi* Oldroyd, 1957: 473 no figs.**

Holotype. Malawi • ♀; Baltic Estate, Blantyre, W.J. Gray. October to November; 16°4'13"S, 35°8'49"E; in British Museum (NMHUK).

Paratypes. • 7 ♀ same locality as holotype, 1 ♀ Cholo, Nyasaland [Malawi], R.C. Wood, 1.XI.26; in KwaZulu-Natal Museum, NMSA-DIP 042270; type number 367. Fig. 2.

Current status. *Cydistomyia* (*Amanella*) *grayi* (Oldroyd, 1957); new combination.

Remarks. *Canalicula* was originally described as a subgenus of *Amanella* by Oldroyd (1954) alongside *Amanella* (*Amanella*). *Amanella*, as genus, was later synonomised with the genus *Cydistomyia* by Mackerras (1964, pp. 96–99). Usher (1965), however, retained *Amanella* as a subgenus of *Cydistomyia*, but did not find any support to retain any further subdivision or to include *Canalicula* as a separate subgenus. *Cydistomyia grayi*, originally assigned to the subgenus *Canalicula* should therefore be transferred to *Cydistomyia* (*Amanella*).

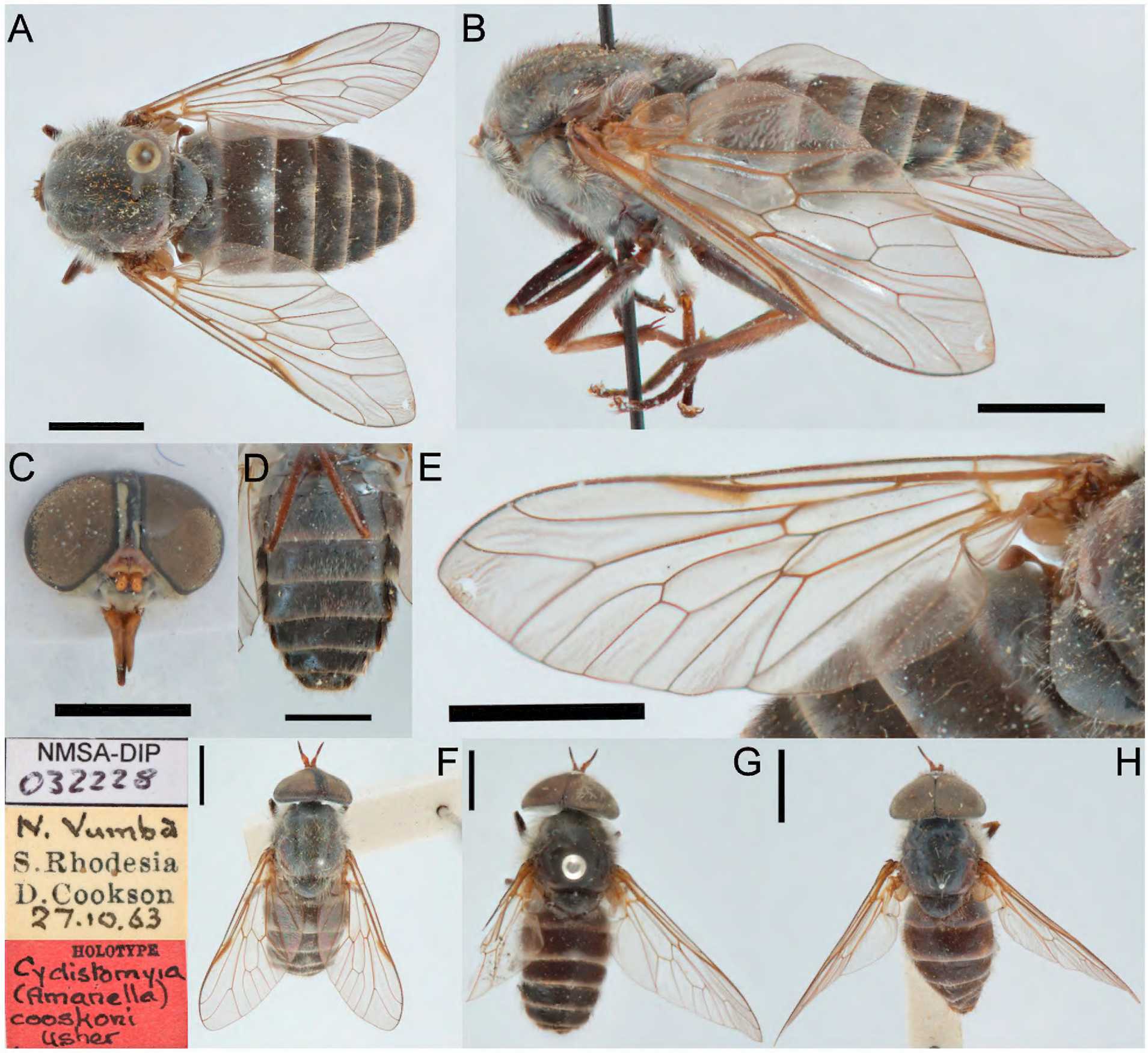

Figure 1. *Cydistomyia* (*Amanella*) *cooksoni* holotype **A** dorsal **B** lateral **C** head **D** ventral **E** wing **F–H** paratypes **F** NMSA-DIP 137592 **G** NMSA-DIP 137593 **H** NMSA-DIP 032252. Scale bars: 2 mm.

There are seven female paratypes listed in the publication with the same locality information as the holotype but no indication of where they are deposited. According to the Natural History Museum, London (NHMUK) website, there are five paratypes in their collection, all with identical collection data. There is one paratype from a different locality listed in the publication that is deposited in the KZNM collection. The specimen is in good condition. The depository location of the remaining paratypes is unknown.

***Cydistomyia* (*Amanella*) *ignota* Usher, 1965: 77 figs 14b, 16m, n, 17b.**

Holotype. South Africa • ♀; {Eastern Transvaal} [Limpopo] Haenertsburg, 24–31.XII.1921; C. J. Swierstra; NMSA-Dip 055013; 23°56'S, 29°57'E; type number 1900. Fig. 3

Current status. *Cydistomyia* (*Amanella*) *ignota* Usher, 1965; original combination.

Figure 2. *Cydistomyia* (*Amanella*) *grayi* paratype – NMSA-DIP 042270. Scale bar: 2 mm.

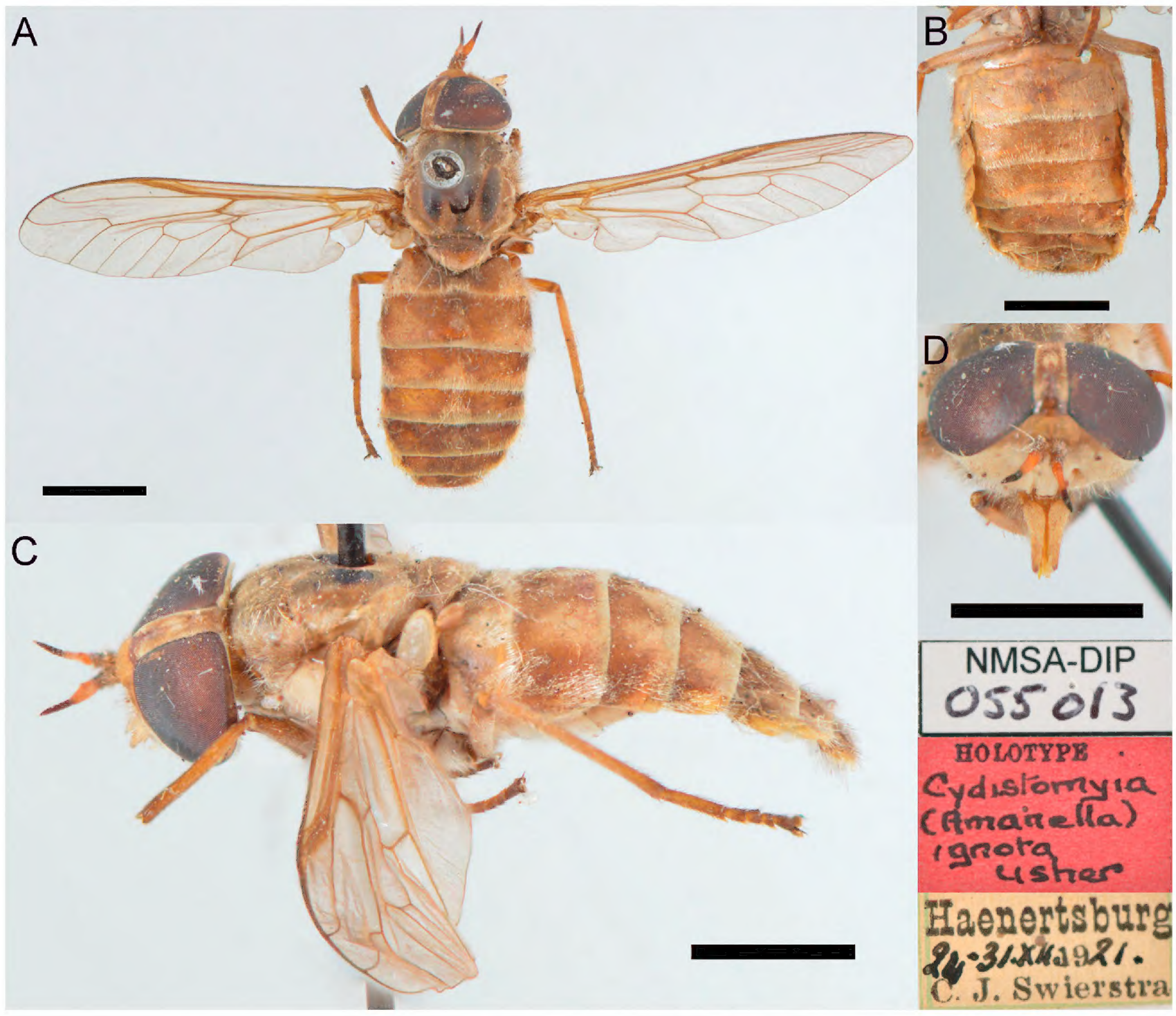

Figure 3. *Cydistomyia* (*Amanella*) *ignota* holotype **A** dorsal **B** ventral **C** lateral **D** head. Scale bars: 2 mm.

Remarks. According to the original publication, this specimen was deposited in the Transvaal Museum. The Transvaal Museum's (now Ditsong Museum of Natural History - TMSA) Diptera collection was obtained by the Natal Museum (now KZNM) by an exchange in 1975. The holotype is the only type specimen, as no paratypes are listed. The specimen is in good condition except for a missing portion of the left foreleg.

***Cydistomyia* (*Amanella*) *ingridina* Usher, 1965: 75 figs 14d, 16e, g, 17a.**

Holotype. South Africa • ♀; Natal [KwaZulu-Natal] Gillitts, Pinetown district, B & P. Stuckenberg, 14-2-62; NMSA-Dip 053216; 29°48'S, 30°48'E; type number 1899. Fig. 4.

Current status. *Cydistomyia* (*Amanella*) *ingridina* Usher, 1965; original combination.

Remarks. The publication adds "from the upper Empolweni Valley" to the location of the holotype. It lists a paratype from the same location, collected on 20 December 1962, but does not state where it was deposited. The paratype is not in the KZNM collection and is not listed on the NHMUK website. The holotype is in good condition.

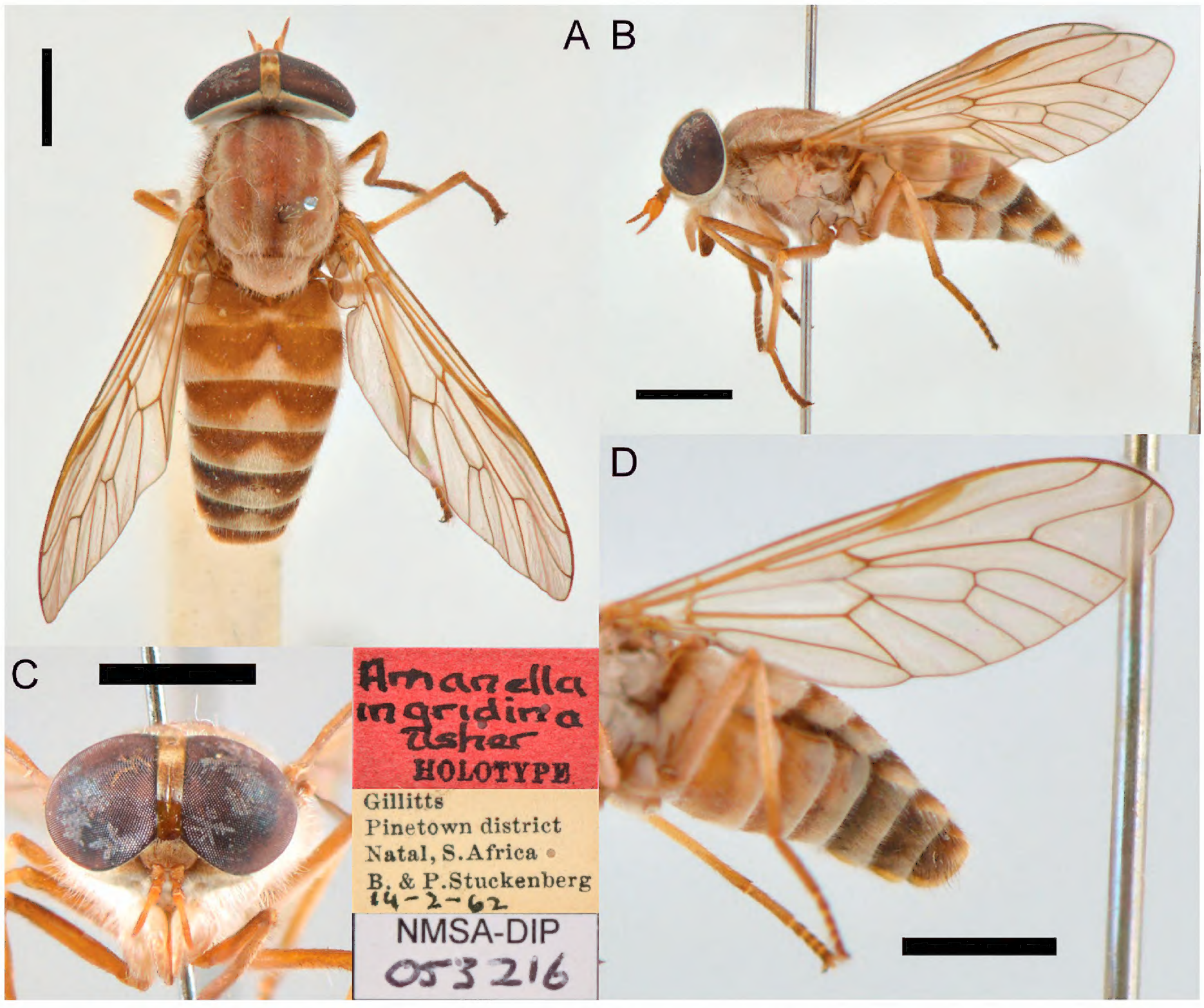

Figure 4. *Cydistomyia* (*Amanella*) *ingridina* holotype **A** dorsal **B** lateral **C** head **D** ventral. Scale bars: 2 mm.

***Cydistomyia* (*Amanella*) *shaka* Usher, 1970: 334 figs 6–9.**

Holotype. South Africa • ♀; Natal [KwaZulu-Natal] Pateni Estates, Richmond, B Stuckenberg, XI-68. NMSA-Dip 055552; 29°56'S, 30°9'E; type number 1888. Fig. 5.

Current status. *Cydistomyia* (*Amanella*) *shaka* Usher, 1970; original combination.

Remarks. The holotype is in good condition.

***Cydistomyia* (*Amanella*) *zimbiti* Usher, 1970: 329 figs 1–5.**

Holotype. South Africa • ♀ Natal [KwaZulu-Natal] Zimbiti Forest, 7 miles north-east of Kranskop, November 1967, P. J. and B. R. Stuckenberg; NMSA-Dip 055784; 28°53'10"S, 30°56'22"E; type number 1887. Fig. 6.

Paratypes. Four ♀ with the same collecting information as holotype.

Current status. *Cydistomyia* (*Amanella*) *zimbiti* Usher, 1970; original combination.

Remarks. The publication lists a holotype, an allotype and four paratypes. There is no allotype and only three paratypes in the KZNM collection. There is no information regarding the allotype or other paratype and their current depository location is unknown. The holotype is in good condition.

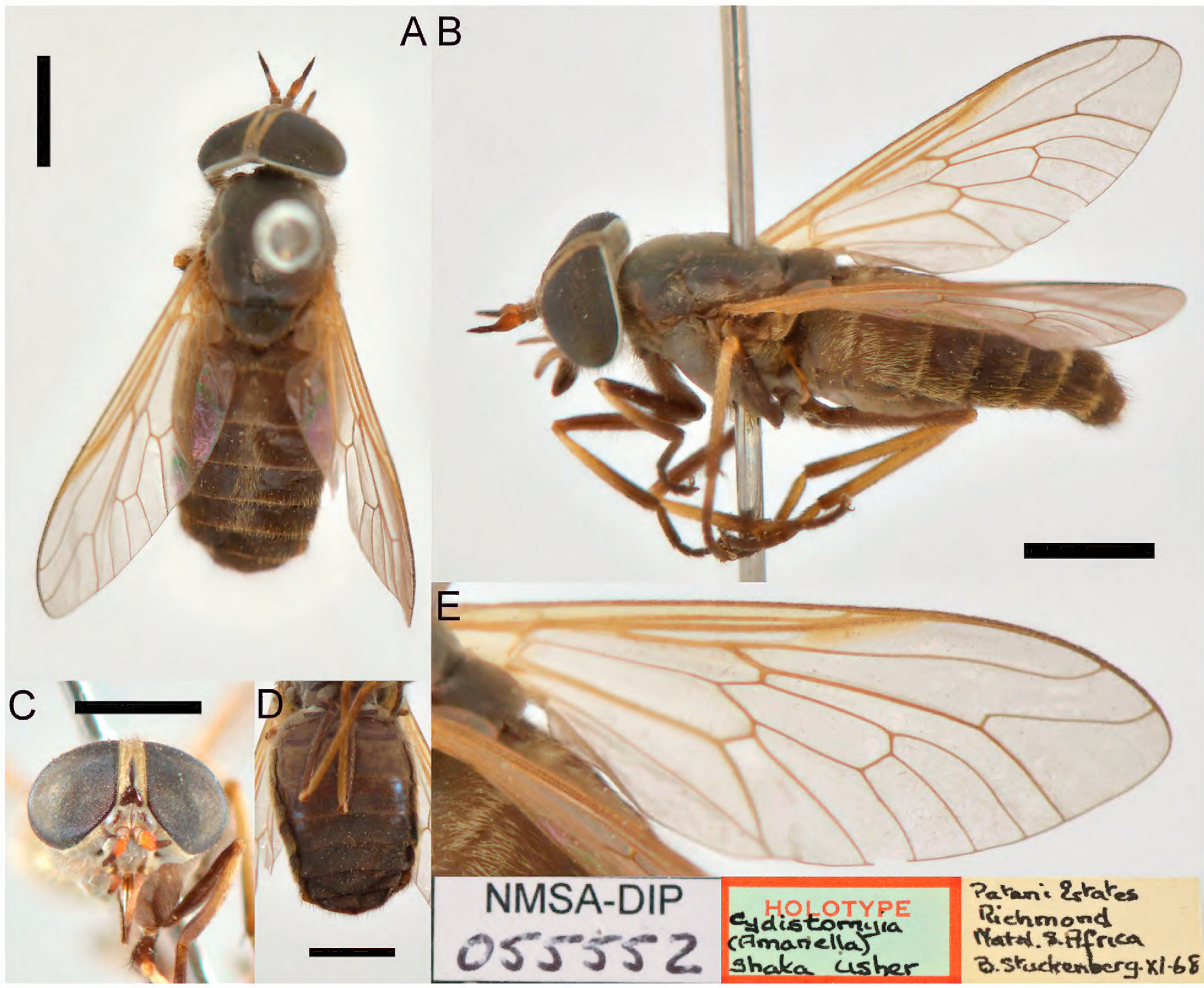

Figure 5. *Cydistomyia* (*Amanella*) *shaka* holotype **A** dorsal **B** lateral **C** head **D** venral **E** wing. Scale bars: 2 mm.

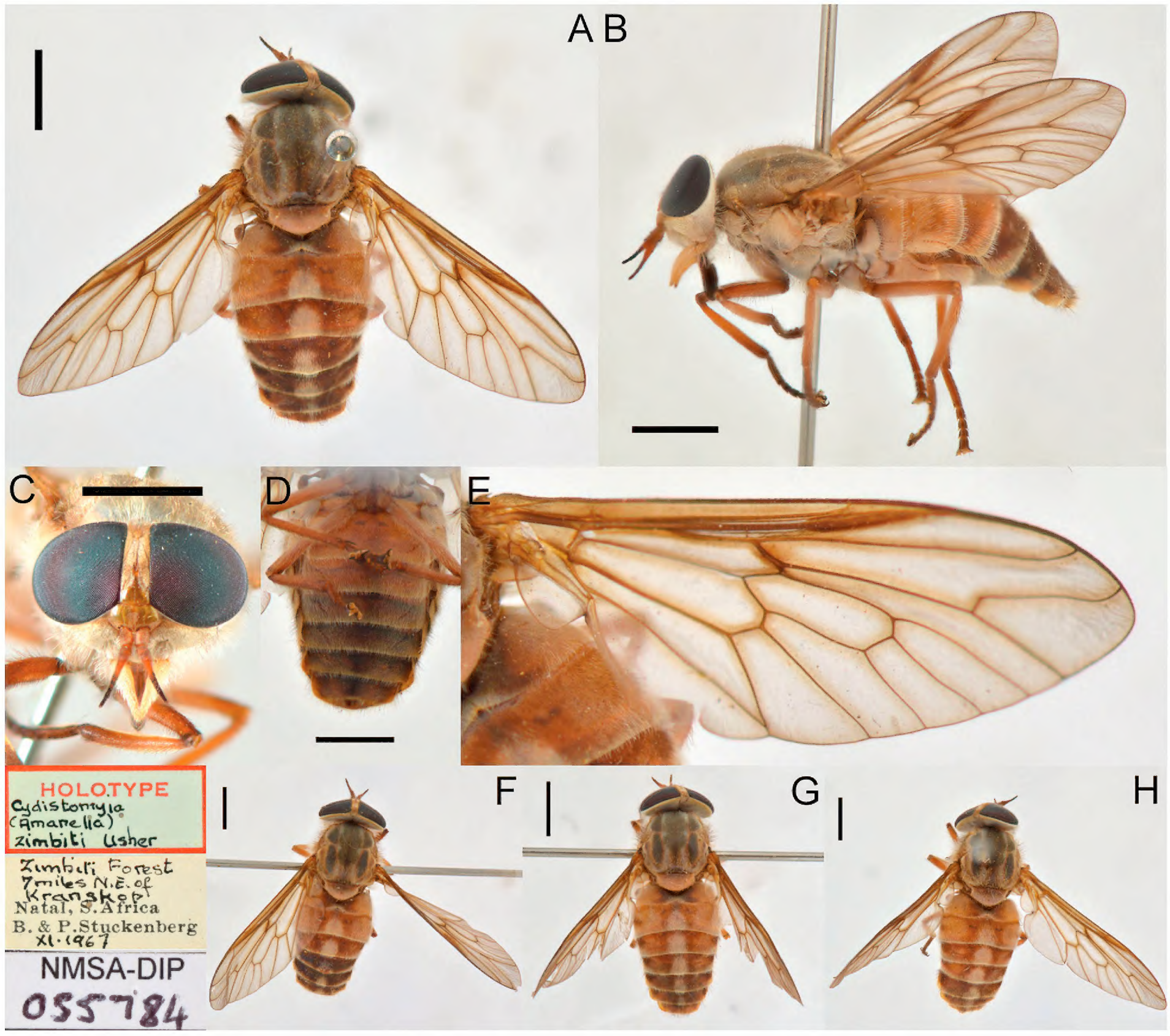

Figure 6. *Cydistomyia* (*Amanella*) *zimbiti* holotype **A** dorsal **B** lateral **C** head **D** ventral **E** wing **F–H** paratypes **F** NMSA-DIP 137743 **G** NMSA-DIP 137744 **H** NMSA-DIP 137745. Scale bars: 2 mm.

***Limata kuhnelti* Usher, 1967: 603 figs 7–9.**

Holotype. South West Africa [Namibia] • ♀; Gobabeb, 1 March 1964; NMSA-Dip 052588; 23°33'S, 15°2'E type number 1140. Fig. 7.

Current status. *Bartolomeudiasiella kuhnelti* (Usher, 1967); transferred to *Bartolomeudiasiella* in Travassos Santos Dias (1990).

Remarks. The publication states that the holotype was collected by Professor W. Kühnelt of Vienna University, at the Namib Desert Research Station in Gobabeb. A publication by Travassos Santos Dias (1990) transferred *kuhnelti* to a new genus, as *Bartolomeudiasiella kuhnelti* — a senior synonym of *Bartolomeudiasiella atlanticus*. However, this new combination seems to have been overlooked, and is currently not recognised by the online checklist databases, Catalogue of Life, GBIF or Systema Dipterorum. The antennae of the holotype are broken, the right wing is folded and the abdomen is damaged. There are no paratypes listed for this species.

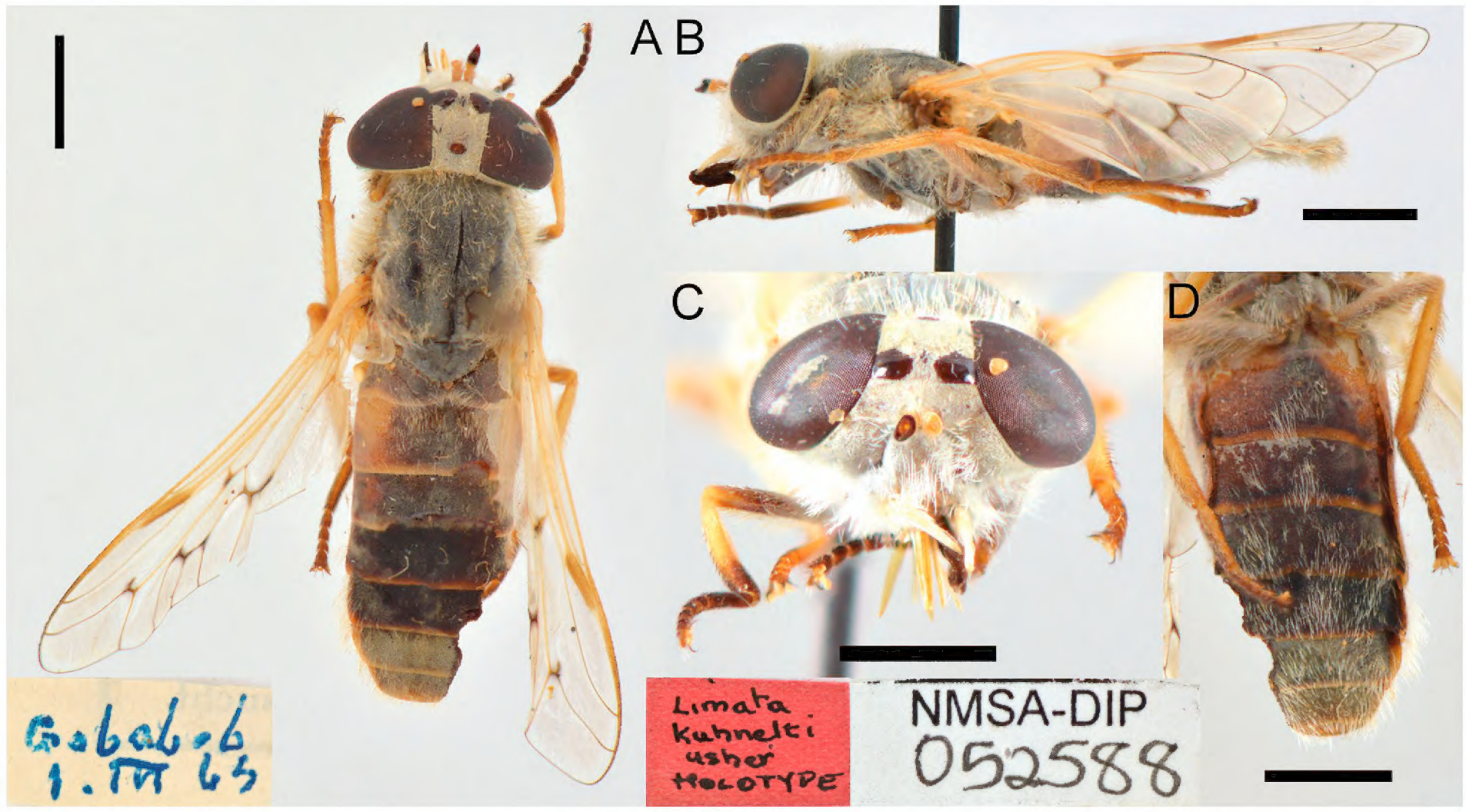

Figure 7. *Bartolomeudiasiella kuhnelti* holotype **A** dorsal **B** lateral **C** head **D** ventral. Scale bars: 2 mm.

***Limata miranda* Usher, 1968: 29 figs 13–16.**

Holotype. South Africa • ♀; Eastern Cape Province; Hogsback north of Alice; 2–3 November 1964; B & P Stuckenberg; NMSA-Dip 052841; 32°35'S, 27°5'E; type number 386. Fig. 8.

Current status. *Limata miranda* Usher, 1968; original combination.

Remarks. The publication lists a female holotype and a male specimen (not designated type status) deposited in the Natal Museum (KZNM). There are, however, no male specimens in the collection. The male was reportedly collected in Zimbaba Forest in the Kranskop District. Usher lists several differences between the male and the female holotype stating that it might be the male of another species (Usher 1968). The holotype is in good condition. There are no paratypes for this species.

***Limata parafacialis* Oldroyd, 1957: 469 no figs.**

Holotype. South Africa • ♀; Eastern Cape Province, Grahamstown, 16.12-1936; R.C. Wood; 33°18'33"S, 26°31'42"E; in British Museum (NHMUK).

Paratypes.• Eastern Cape Province, Sheldon; in the KwaZulu-Natal Museum. NMSA-DIP 050517; NMSA-DIP 141811; NMSA-DIP 141812 type number 929. Fig. 9.

Current status. *Limata parafacialis* Usher, 1968; original combination.

Remarks. There are six female paratypes listed in the publication that were reportedly deposited in the South African Institute for Medical Research (SAIMR) in Johannesburg, South Africa. The Natal Museum (now KZNM) obtained part of the fly collection of the SAIMR by donation in 1983. There are only three paratypes in the KZNM collection. The remaining three paratypes are listed on the Natural History Museum, London (NHMUK) website as being in their collection,

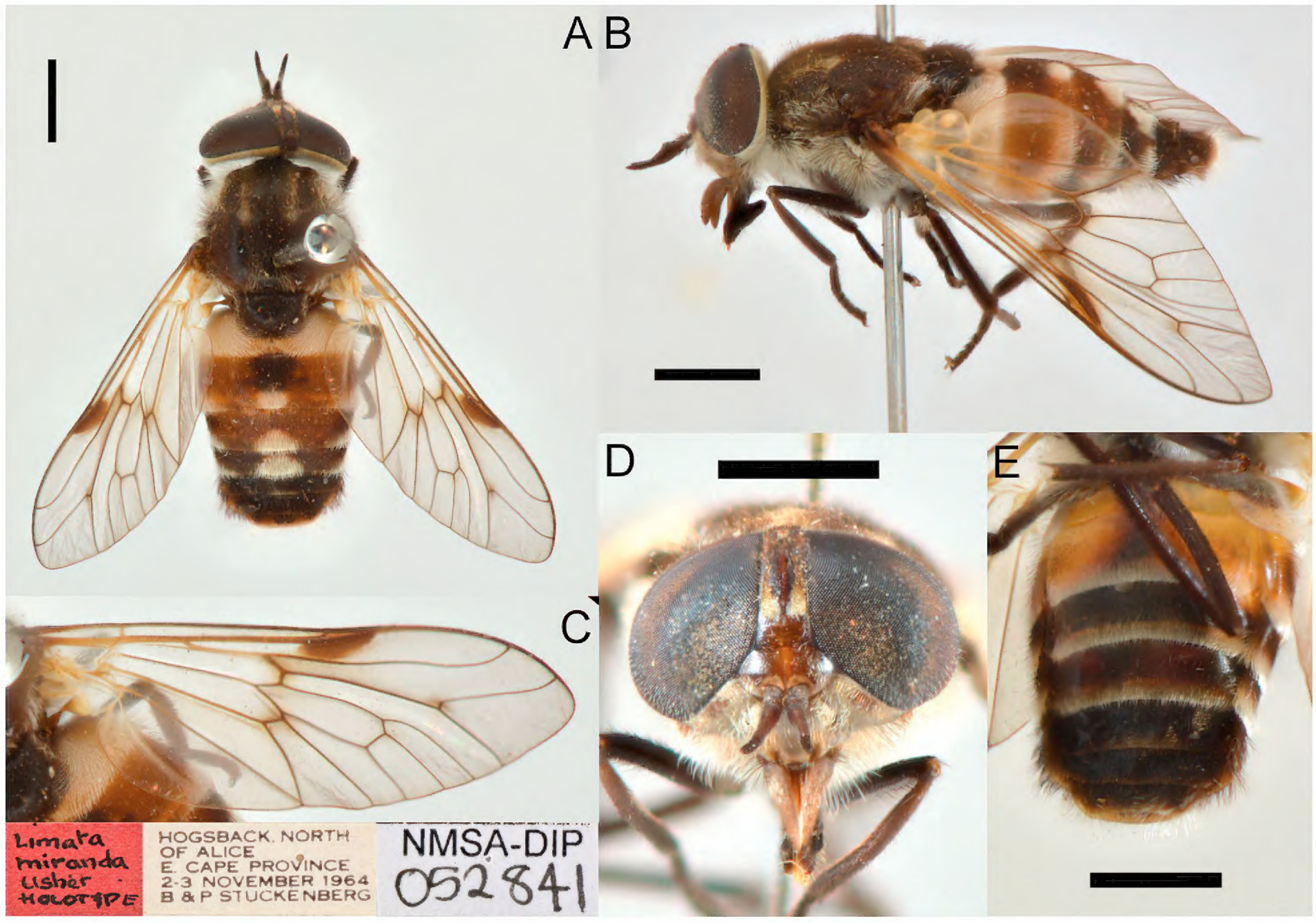

Figure 8. *Limata miranda* holotype **A** dorsal **B** lateral **C** wing **D** head **E** ventral. Scale bars: 2 mm.

along with the holotype. There is no collection date or collector name on any of the paratype specimens housed at KZNM. One paratype is missing a head, another has a damaged wing and the third paratype is missing a flagellum.

Tribe Tabanini

Genus *Hybomitra* Enderlein, 1922: 347. Type species *Hybomitra solox* Enderlein, 1922.
Genus *Tabanus* Linnaeus, 1758: 601. Type species *Tabanus bovinus* Linnaeus by subsequent designation of Latreille 1810: 443.
Genus *Therioplectes* Zeller, 1842: 1819. Type species *Tabanus tricolor* Zeller by subsequent designation of Coquillett 1910: 614.

***Tabanus crocodilinus* Austen, 1912: 284 no figs.**

Holotype. Nyasaland [Malawi] • ♀; Lufira River, North Nayasa, 6.viii.1909, J.B. Davey; 9°48'33"S, 33°44'49"E; in British Museum (NHMUK).

Paratype. Nyasaland [Malawi], • Lufira River, N. Nayasa, 6.viii.1909, J.B. Davey; in KwaZulu-Natal Museum. NMSA-DIP 053624 type number 369. Fig. 10a, b.

Current status. *Tabanus crocodilinus* Austen, 1912; original combination.

Remarks. The publication states there are 17 paratypes – 16 from Malawi and one from Sudan. Five paratypes were donated to the "National Collection" according to the publication – there are six paratypes from Malawi and one

Figure 9. *Limata parafacialis* paratypes **A** NMSA-DIP 050517 **B** NMSA-DIP 141811 **C** NMSA-DIP 141812. Scale bars: 2 mm.

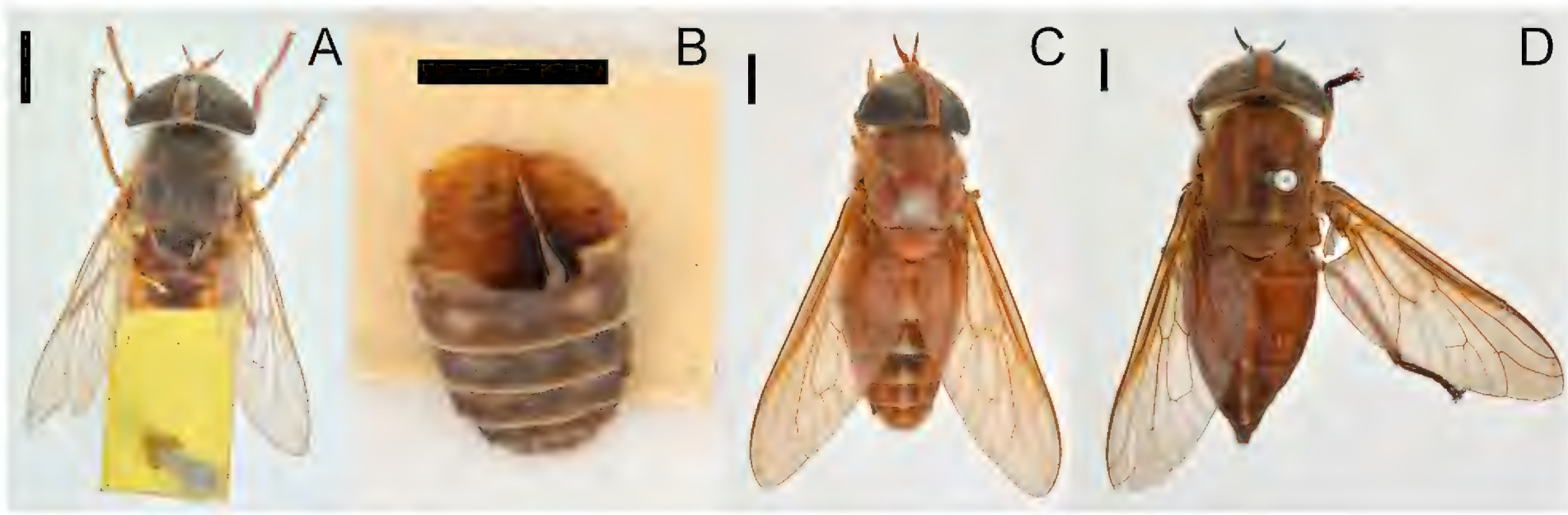

Figure 10. A, B *Tabanus crocodilinus* paratype – NSMA-DIP 053624 **C** *Tabanus flavicoxa* paratype – NMSA-DIP 042100 **D** *Tabanus postacutus* paratype – NMSA-DIP 042072.

from Sudan along with the holotype in the Natural History Museum, London (NHMUK) according to their website. The current locality of the remaining paratypes is unknown. The paratype specimen in KZNM collection is damaged with its abdomen glued to a piece of card pinned below the specimen. It is missing the tarsi of both hind legs and the left wing is slightly damaged.

***Tabanus flavicoxa* Oldroyd, 1954: 275 fig. 195.**

Holotype. Liberia • ♀; Loffa River, Jenne, J. Bequaert; 6°36'4"N, 11°4'26"W; in British Museum (NHMUK).

Paratype. 45 ♀ 1 ♂. 1 ♀ Sierra Leone, Koinadugu District, Jan – Feb 1914, Dr J.S. Pearson; in KwaZulu-Natal Museum. NMSA-DIP 042100 type number 1549. Fig. 10 c.

Current status. *Tabanus flavicoxa* Oldroyd, 1954; original combination.

Remarks. The publication states that the holotype and all the paratypes are either in the British Museum or the Commonwealth Institute of Entomology. There are no specimens of this species listed on the Natural History Museum, London (NHMUK) website. There is no indication of how the KZNM came to house this paratype. The paratype is in good condition.

***Tabanus nefas* Usher, 1971: 9 figs 10–13.**

Holotype Rhodesia [Zimbabwe] • ♀; Chipinda Pools, Lundi River, S. Rhodesia, March 1963, H. Paterson; NMSA-DIP 031908; 21°18'0"S, 31°55'59"E; type number 1904. Fig. 11.

Current status. *Tabanus nefas* Usher, 1971; original combination.

Remarks. There are no paratypes listed for this species. The holotype specimen is in poor condition. The head is on a piece of card pinned below the specimen. One flagellum is missing along with two legs and the hind tarsi.

***Tabanus postacutus* Oldroyd, 1947: 198 figs 1a-c.**

Holotype. Sierra Leone • ♀; Daru, September 1912, E.J. Powell, 7°59'30"N, 10°50'26"W; in British Museum, Nat. Hist (NHMUK).

Paratype. Sierra Leone, Daru, September 1912, E.J. Powell; in KwaZulu-Natal Museum NMSA-DIP 042072 type number 370. Fig. 10d.

Current status. *Tabanus postacutus* Oldroyd, 1947; original combination.

Remarks. There are 231 paratypes listed in the publication. The holotype and a representative series of paratypes were supposed to be deposited in the Natural History Museum in London (NMHUK) but no specimens of this species are listed on their website. The remaining paratypes were deposited in the Imperial Institute of Entomology. There is no indication how the KZNM came to have one of the paratypes. The paratype's wings are slightly damaged, otherwise it is in good condition.

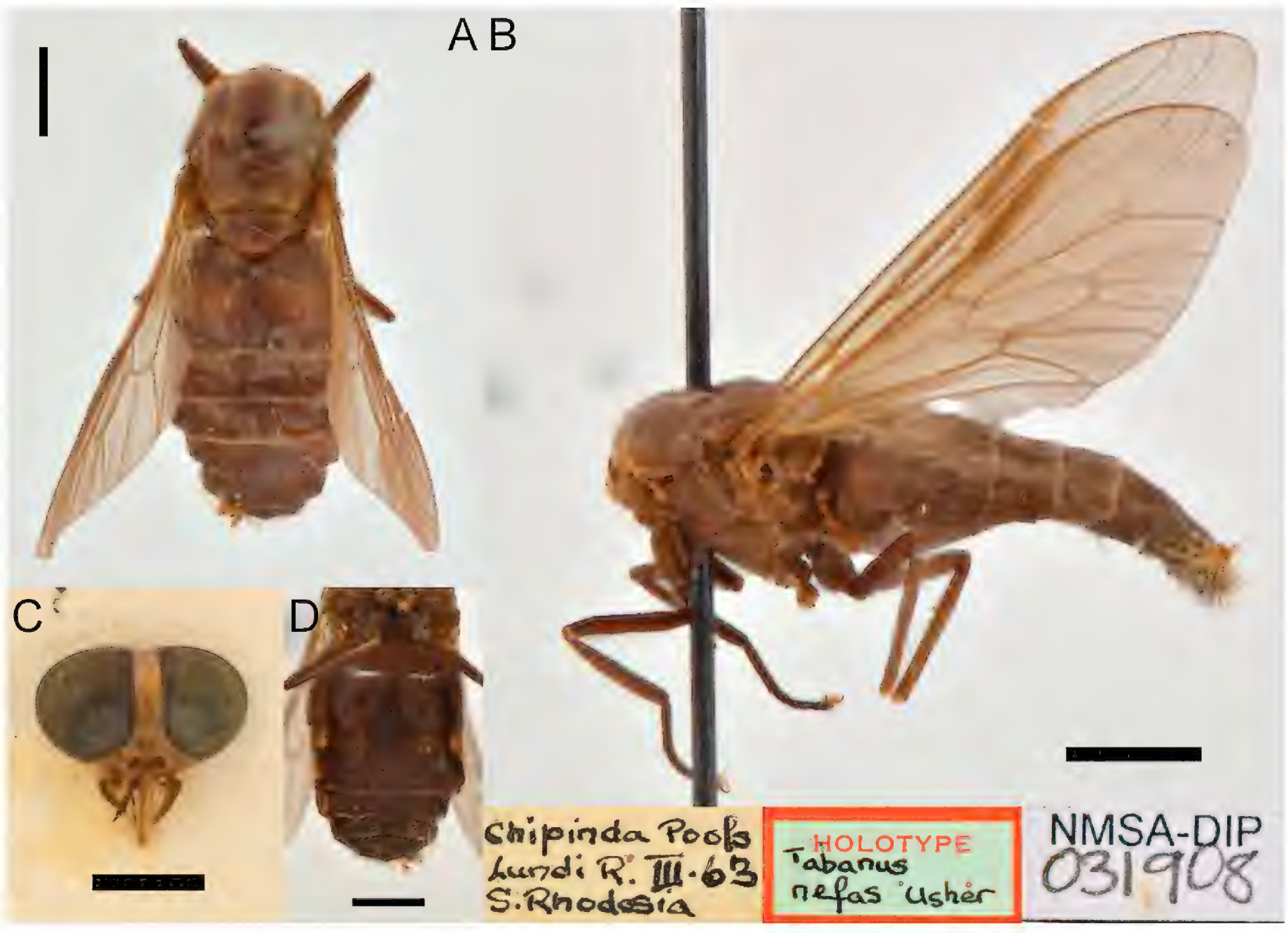

Figure 11. *Tabanus nefas* holotype **A** dorsal **B** lateral **C** head **D** ventral. Scale bars: 2 mm.

***Tabanus saxicolus* Usher, 1965: fig. 6.**

Holotype. South Africa • ♀; Royal Natal National Park, Drakensberg Mountains, 13.IX.63, B&P Stuckenberg; NMSA-DIP 053167; 28°41'S, 28°55'E; type number 1903. Fig. 12.

Paratypes. 5 ♂ Giant's Castle Reserve, Drakensberg Mountains, 18.9.1961; 2 ♂ Royal Natal National Park, Drakensberg Mountains, 15.9.1963.

Current status. *Hybomitra saxicolus* (Usher, 1965): transferred to *Hybomitra* in Williams and Snyman (2024).

Remarks. The type label reads "*Tabanus perplexus*" suggesting Usher changed the name prior to publication. There is no mention of where the holotype was deposited or any mention of the label data in the publication. There is no mention of paratypes in the publication, but there are seven male paratypes in the KZNM collection. There are several notable differences between the holotype and the paratypes, such as the patterning on the abdomen, the presence of an appendix on R_4 of the wings in the males and the colour of the antennae that cast doubt on the holotype and paratypes being of the same species (Williams and Snyman 2024). The holotype is in good condition with the right wing glued onto the thorax. All the paratypes are in good condition.

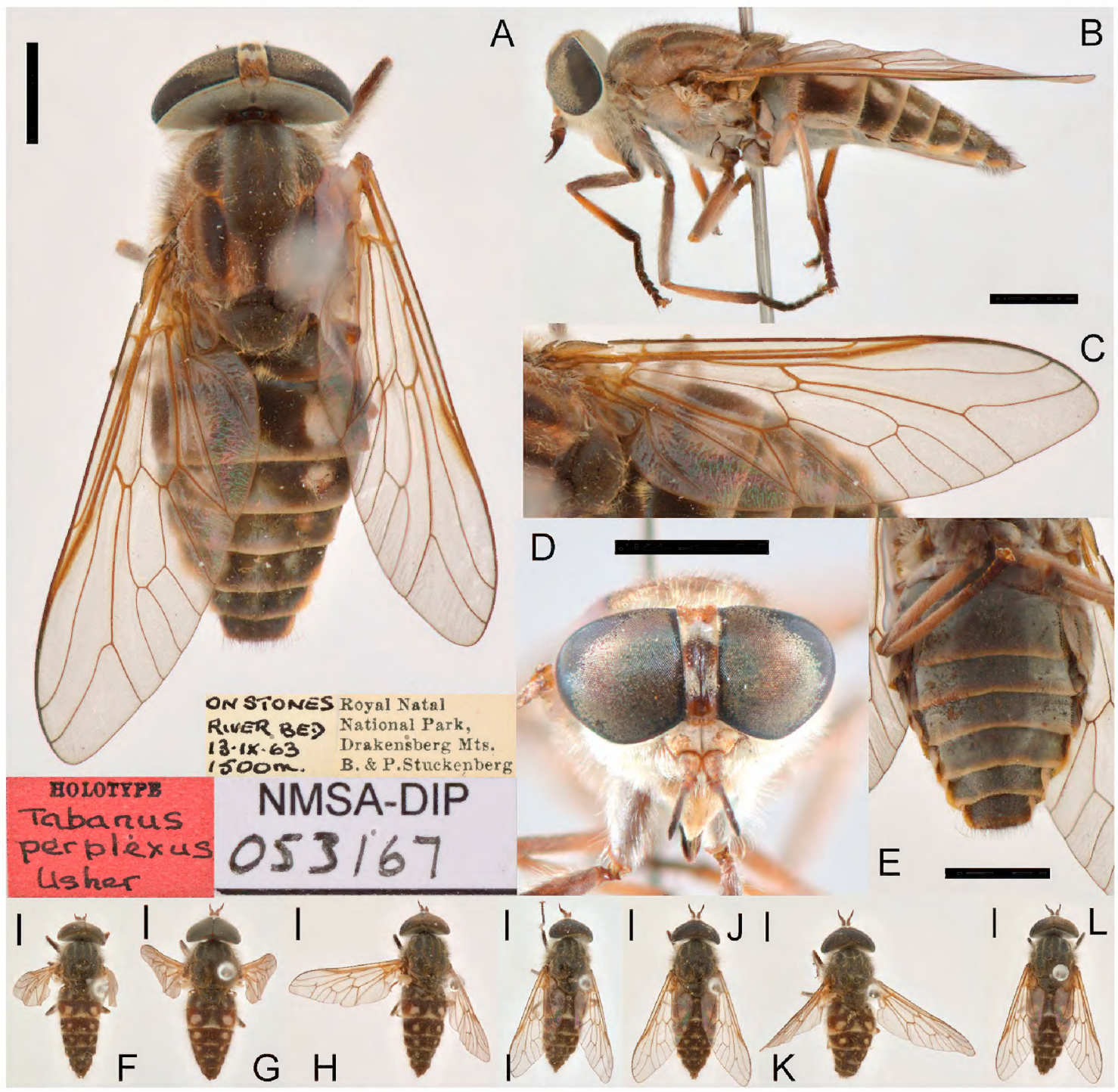

Figure 12. *Hybomitra saxicolus* holotype **A** dorsal **B** lateral **C** wing **D** head **E** ventral **F–L** paratypes **F** NMSA-DIP 138037 **G** NMSA-DIP 138038 **H** NMSA-DIP 138039 **I** NMSA-DIP 138040 **J** NMSA-DIP 138041 **K** NMSA-DIP 138042 **L** NMSA-DIP 138043. Scale bars: 2 mm.

***Tabanus* (*Therioplectes*) *zumpti* Dias, 1956: 2 fig. 1.**

Holotype. South Africa • ♀; Umtamvuna River, 27.11.1950; NMSA-DIP 050132; 31.0667°S, 30.1832°E; type number 371. Fig. 13.

Current status. *Therioplectes zumpti* (Dias, 1956).

Remarks. This species was originally described as a species in the sub-genus, *Therioplectes*, which was later elevated to genus status. The holotype was deposited in the South African Institute of Medical Research (SAIMR). The Natal Museum (now KZNM) obtained part of the fly collection of the SAIMR by donation in 1983. The label does not indicate a collector, but the publication states Dr F. Zumpt as the collector. The publication lists the locality as "near the Untamura river" which is obviously a transcription error as no such river exists. The specimen is missing one flagellum, otherwise it is in good condition.

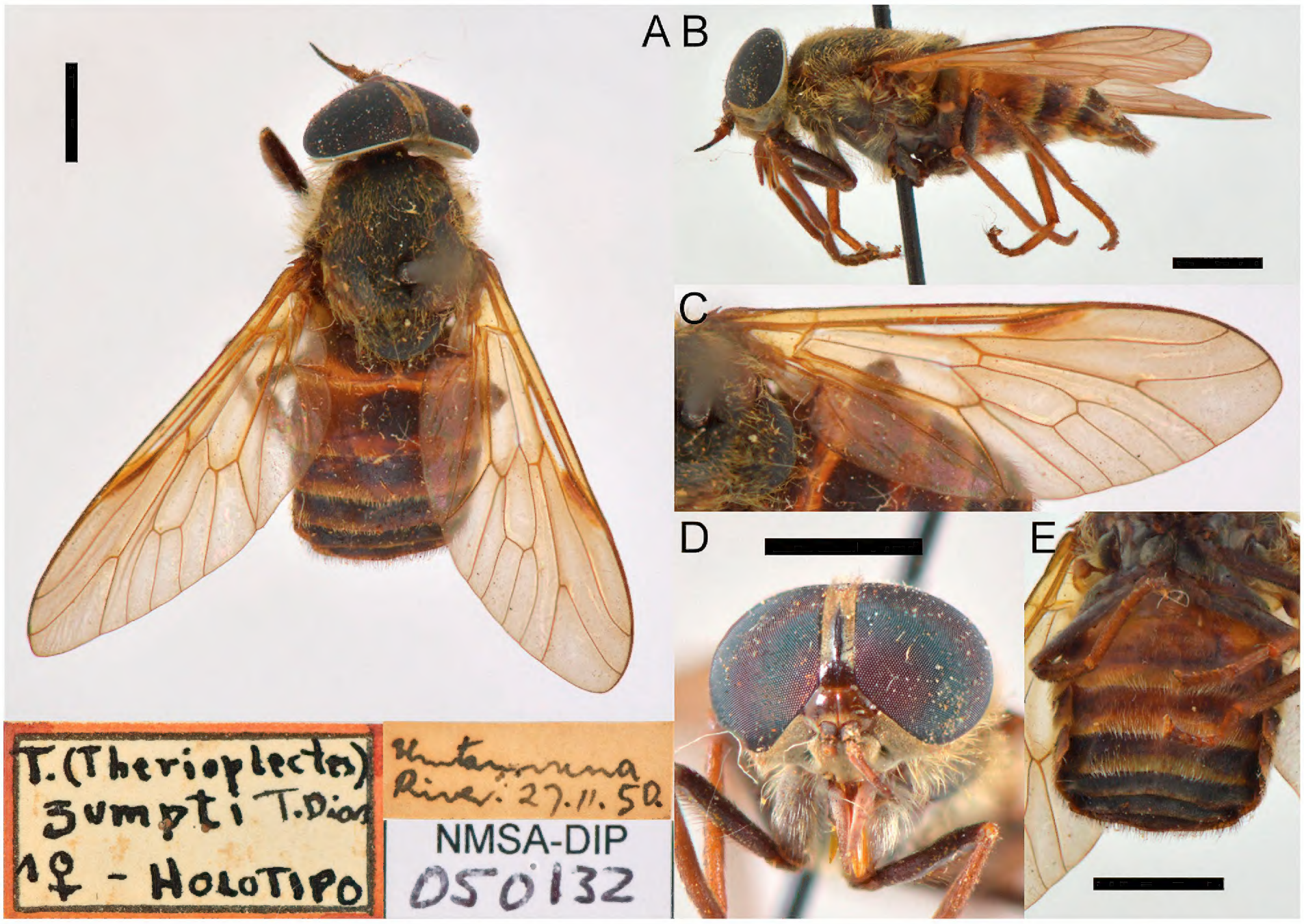

Figure 13. *Therioplectes zumpti* holotype **A** dorsal **B** lateral **C** wing **D** head **E** ventral. Scale bars: 2 mm.

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Additional information

Conflict of interest

The authors have declared that no competing interests exist.

Ethical statement

No ethical statement was reported.

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Author contributions

KW - conceptualised, took photos, wrote first daft, edited draft. LS - conceptualised, edited images, edited draft.

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Data availability

All the specimen data is available on GBIF and from the KZNM on request.

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